

## Claims

What is claimed is:

1. A pair of dry type patches for teeth whitening having a patch for upper teeth and  
5 a patch for lower teeth, in which the patch for upper teeth has a shape different from the patch  
for lower teeth, and each patch has a controlled width and shape such that the contact area of  
each patch with gums is minimized.
2. The pair of dry type patches for teeth whitening according to claim 1, wherein the  
10 patch for upper teeth has a central portion covering right and left upper central incisors which is  
widest, and the patch for lower teeth has either portion covering right and left lower canine  
teeth which is widest.
3. The pair of dry type patches for teeth whitening according to claim 1, wherein  
15 adhesive strength of the patches to the teeth at least doubles when hydrated by water.
4. The pair of dry type patches for teeth whitening according to claim 2, wherein  
adhesive strength of the patches to the teeth at least doubles when hydrated by water.
- 20 5. The pair of dry type patches for teeth whitening according to claim 1, wherein the  
patches comprise peroxide as a teeth whitening agent and a hydrophilic glassy polymer.
6. The pair of dry type patches for teeth whitening according to claim 2,  
wherein the patches comprise peroxide as a teeth whitening agent and a hydrophilic glassy  
25 polymer.

7. The pair of dry type patches for teeth whitening according to claim 5, wherein the patches further comprise a peroxide stabilizer together with peroxide.

5           8. The pair of dry type patches for teeth whitening according to claim 6, wherein the patches further comprise a peroxide stabilizer together with peroxide.

9. The pair of dry type patches for teeth whitening according to claim 1, wherein each patch has a width similar to the size of teeth so as not to be folded into the back portion of teeth.  
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10. The pair of dry type patches for teeth whitening according to claim 2, wherein each patch has a width similar to the size of teeth so as not to be folded into the back portion of teeth.

15           11. The pair of dry type patches for teeth whitening according to claim 1, wherein each patch is folded into the back portion of teeth, and has a cut line at the folded portion so as to be easily folded into the back portion of teeth.

12. The pair of dry type patches for teeth whitening according to claim 2, wherein  
20 each patch is folded into the back portion of teeth, and has a cut line at the folded portions so as to be easily folded into the back portion of teeth.

13. The pair of dry type patches for teeth whitening according to claim 1, wherein the patch for upper teeth has a width of 0.5~2.5cm, and the patch for lower teeth has a width of  
25 0.3~2.0cm.

14. The pair of dry type patches for teeth whitening according to claim 2, wherein the patch for upper teeth has a width of 0.5~2.5cm, and the patch for lower teeth has a width of 0.3~2.0cm.

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15. The pair of dry type patches for teeth whitening according to claim 13, wherein the patch for upper teeth has a width of 0.7~1.5cm, and has a greatest width of 0.8~1.5cm.

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16. The pair of dry type patches for teeth whitening according to claim 14, wherein the patch for upper teeth has a width of 0.7~1.5cm, and has a greatest width of 0.8~1.5cm.

17. The pair of dry type patches for teeth whitening according to claim 13, wherein the patch for lower teeth has a width of 0.5~1.5cm, and has a greatest width of 0.6~1.5cm.

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18. The pair of dry type patches for teeth whitening according to claim 14, wherein the patch for lower teeth has a width of 0.5~1.5cm, and has a greatest width of 0.6~1.5cm.

19. The pair of dry type patches for teeth whitening according to claim 1, wherein the patches comprise a water-insoluble outermost layer.

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20. The pair of dry type patches for teeth whitening according to claim 1, wherein the patch for upper teeth and/or the patch for lower teeth include a notch formed at the center of the portion contacted with gums.

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21. A patch for teeth whitening and having a contact area, comprising:  
a gum line perimeter segment, the gum line perimeter segment being shaped  
to substantially match a human gum line; and  
at least one perimeter segment, the at least one other perimeter segment  
5 joining with the gum line perimeter segment to define a perimeter of the contact area;
22. The patch of claim 21, wherein the gum line perimeter segment comprises a  
wide portion.
- 10 23. The patch of claim 22, wherein the wide portion is shaped for aligning  
contact with upper central incisor teeth.
24. The patch of claim 21, wherein the gum line perimeter segment comprises a  
plurality of wide portions.
- 15 25. The patch of claim 24, wherein each of the plurality of wide portions are  
shaped for aligning contact with lower canine teeth.
26. The patch of claim 21, wherein the patch comprises a dry-type patch
- 20 27. The patch of claim 21, comprising at least one alignment indicia positioned  
along the gum line perimeter segment.
28. The patch of claim 27, wherein the at least one alignment indicia is centered  
25 along the gum line perimeter segment.

29. The patch of claim 27, wherein a plurality of alignment indicia are spaced along the gum line perimeter segment.

5 30. The patch of claim 27, wherein the at least one alignment indicia comprises a notch.

31. The patch of claim 31, wherein the at least one alignment indicia comprises a graphical indicator on the surface of the patch.

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32. The patch of claim 27, wherein the graphical indicator comprises:  
an alignment line; and  
a point of intersection between the alignment line and the gum line  
perimeter segment;

15 wherein the alignment line is substantially perpendicular to the gum line  
segment at the point of intersection.

33. The patch of claim 21, comprising:  
a first side indicia positioned on the at least one perimeter segment;

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and

a second side indicia positioned on the at least one perimeter  
segment opposing the first side indicia along a substantially horizontal axis;  
wherein the substantially horizontal axis comprises a folding axis.

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34. The patch of claim 33, wherein the first side indicia comprises a first side

notch, and wherein the second side indicia comprises a second side notch.

35. The patch of claim 23, wherein the at least one perimeter segment comprises:

5 an opposing perimeter segment being opposite the gum line perimeter segment; and

a plurality of side perimeter segments joining the gum line perimeter segment and the opposing perimeter segment.

10 36. The patch of claim 35, wherein the gum line perimeter segment comprises a wide portion.

37. The patch of claim 36, wherein the wide portion is shaped for aligning contact with upper central incisor teeth.

15 38. The patch of claim 35, wherein the gum line perimeter segment comprises a plurality of wide portions.

20 39. The patch of claim 38, wherein each of the plurality of wide portions are shaped for aligning contact with lower canine teeth.

40. The patch of claim 35, wherein the patch comprises a dry-type patch

25 41. The patch of claim 35, comprising at least one alignment indicia positioned along the gum line perimeter segment.

42. The patch of claim 41, wherein the at least one alignment indicia is centered along the gum line perimeter segment.
- 5 43. The patch of claim 41, wherein a plurality of alignment indicia are spaced along the gum line perimeter segment.
44. The patch of claim 41, wherein the at least one alignment indicia comprises a notch.
- 10 45. The patch of claim 41, wherein the at least one alignment indicia comprises a graphical indicator on the surface of the patch.
46. The patch of claim 45, wherein the graphical indicator comprises:  
15 an alignment line; and  
a point of intersection between the alignment line and the gum line perimeter segment;  
wherein the alignment line is substantially perpendicular to the gum line segment at the point of intersection.
- 20 47. The patch of claim 35, comprising:  
a first side indicia positioned on the at least one perimeter segment;  
and  
a second side indicia positioned on the at least one perimeter  
25 segment opposing the first side indicia along a substantially horizontal axis;

wherein the substantially horizontal axis comprises a folding axis.

48. The patch of claim 47, wherein the first side indicia comprises a first side notch, and wherein the second side indicia comprises a second side notch.

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49. The patch of claim 35, wherein at least one cut line extends from the opposing perimeter segment to inside the perimeter of the contact area.

50. The patch of claim 49, wherein the at least one cut line comprises two cut lines.

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51. The patch of claim 50, wherein a first of the two cut lines intersects the opposing perimeter segment at a normal angle, and wherein a second of the two cut lines intersects the opposing perimeter segment at another normal angle.

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52. The patch of claim 35, wherein the at least one perimeter segment comprises a plurality of recessed perimeter segments.

53. The patch of claim 35, wherein the opposing perimeter segment comprises a plurality of recessed perimeter segments.

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54. The patch of claim 53, wherein the recessed perimeter segments recess from the opposing perimeter segment towards the gum line perimeter segment.

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55. The patch of claim 54, wherein the recessed perimeter segments recess from



the opposing perimeter segment towards the gum line perimeter segment to define a noncontact area, said noncontact area for aligning noncontact with upper lateral incisor teeth.

5 56. The patch of claim 54, wherein the recessed perimeter segments recess from the opposing perimeter segment towards the gum line perimeter segment to define a noncontact area, said noncontact area for aligning noncontact with lower lateral incisor teeth.

10 57. The patch of claim 54, comprising a first contact area width of 0.7~1.5cm and a second contact area width of 0.8~1.5cm.

58. The patch of claim 54, comprising a first contact area width of 0.5~1.5cm and a second contact area width of 0.6~1.5cm.

15 59. The patch of claim 35, comprising a contact area width of 0.5~2.5cm.

60. The patch of claim 35, comprising a contact area width of 0.5~2.5cm.

61. A contact surface for a flexible teeth whitening material, the contact surface having a contact area comprising:

20 a gum line perimeter segment, the gum line perimeter segment being shaped to substantially match a human gum line; and

at least one perimeter segment, the at least one other perimeter segment joining with the gum line perimeter segment to define a perimeter of the contact area.

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62. The contact surface of claim 61, wherein the at least one perimeter segment comprises:

an opposing perimeter segment being opposite the gum line perimeter segment; and

5 a plurality of side perimeter segments joining the gum line perimeter segment and the opposing perimeter segment.

63. The contact surface of claim 62, wherein the gum line perimeter segment comprises a wide portion.

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64. The contact surface of claim 63, wherein the wide portion is shaped for aligning contact with upper central incisor teeth.

65. The contact surface of claim 62, wherein the gum line perimeter segment comprises a plurality of wide portions.

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66. The contact surface of claim 65, wherein each of the plurality of wide portions are shaped for aligning contact with lower canine teeth.

67. The contact surface of claim 61, wherein the flexible teeth whitening material comprises a patch.

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68. The contact surface of claim 67, wherein the patch comprises a dry-type patch.

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69. The contact surface of claim 62, comprising at least one alignment indicia positioned along the gum line perimeter segment.

5 70. The contact surface of claim 69, wherein the at least one alignment indicia is centered along the gum line perimeter segment.

71. The contact surface of claim 69, wherein a plurality of alignment indicia are spaced along the gum line perimeter segment.

10 72. The contact surface of claim 69, wherein the at least one alignment indicia comprises a notch.

73. The contact surface of claim 69, wherein the at least one alignment indicia comprises a graphical indicator on the surface of the patch.

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74. The contact surface of claim 73, wherein the graphical indicator comprises:  
an alignment line; and  
a point of intersection between the alignment line and the gum line  
perimeter segment;

20 wherein the alignment line is substantially perpendicular to the gum line  
segment at the point of intersection.

75. The contact surface of claim 61, comprising:  
a first side indicia positioned on the at least one perimeter segment;  
and

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a second side indicia positioned on the at least one perimeter segment opposing the first side indicia along a substantially horizontal axis; wherein the substantially horizontal axis comprises a folding axis.

5           76.       The contact surface of claim 75, wherein the first side indicia comprises a first side notch, and wherein the second side indicia comprises a second side notch.

77.       The contact surface of claim 62, wherein at least one cut line extends from the opposing perimeter segment to inside the perimeter of the contact area.

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78.       The contact surface of claim 77, wherein the at least one cut line comprises two cut lines.

79.       The contact surface of claim 78, wherein a first of the two cut lines intersects the opposing perimeter segment at a normal angle, and wherein a second of the two cut lines intersects the opposing perimeter segment at another normal angle.

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80.       The contact surface of claim 61, wherein the at least one perimeter segment comprises a plurality of recessed perimeter segments.

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81.       The contact surface of claim 62, wherein the opposing perimeter segment comprises a plurality of recessed perimeter segments.

82.       The contact surface of claim 81, wherein the recessed perimeter segments recess from the opposing perimeter segment towards the gum line perimeter segment.

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83. The contact surface of claim 81, wherein the recessed perimeter segments recess from the opposing perimeter segment towards the gum line perimeter segment to define a noncontact area, said noncontact area for aligning noncontact with upper lateral incisor teeth.

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84. The contact surface of claim 81, wherein the recessed perimeter segments recess from the opposing perimeter segment towards the gum line perimeter segment to define a noncontact area, said noncontact area for aligning noncontact with lower lateral incisor teeth.

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85. The contact surface of claim 81, comprising a first contact area width of 0.7~1.5cm and a second contact area width of 0.8~1.5cm.

86. The contact surface of claim 81, comprising a first contact area width of 0.5~1.5cm and a second contact area width of 0.6~1.5cm.

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87. The contact surface of claim 62, comprising a contact area width of 0.5~2.5cm.

88. The contact surface of claim 62, comprising a contact area width of 0.5~2.5cm.

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89. The contact surface of claim 62, wherein the contact surface comprises: an adhesive layer comprising a tooth whitening agent selected from the group consisting of hydrogen peroxide, carbamide peroxide, calcium peroxide, sodium percarbonate, sodium perborate, tetrasodium pyrophosphate peroxidate, and combinations thereof and a peroxide-

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compatible hydrophilic glassy polymer as a base polymer, whereby the adhesive layer has little or no adhesion strength in a dry state and provides a strong adhesion to teeth while releasing the tooth whitening agent when hydrated on the enamel layers of teeth.

5            90. The contact surface of claim 89, wherein the hydrophilic glassy polymer used in the adhesive layer is selected from the group consisting of polyalkylvinylether-maleic acid copolymer, polyvinyl alcohol, polyacrylic acid, Poloxamer 407, polyvinyl pyrrolidone-vinyl acetate copolymer, polyvinyl pyrrolidone, Polyquaterium-11, Polyquaterium-39, carbomer, hydroxypropylmethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, gelatin, sodium alginate, and combinations thereof.

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91. The contact surface of claim 90, wherein the adhesive layer further comprises a stabilizer for peroxide selected from the group consisting of alkylaryl sulphonates, alkyl sulphates, alkyl carboxylates, alkyl diphenyl oxide disulphonates, sorbitan stearate, Sorbitan monooleate, sorbitan trioleate, and mixtures thereof.

15            92. The contact surface of claim 90, wherein the contact surface further comprises polyphosphate in order to enhance a teeth whitening effect.

93. The contact surface of claim 92, wherein the polyphosphate is selected from the group consisting of tetrasodium pyrophosphate, sodium acid pyrophosphate, sodium hexametaphosphate, sodium tripolyphosphate, sodium potassium tripolyphosphate, tetrapotassium pyrophosphate, acidic sodium metapolyphosphate and combinations thereof.

5           94. The contact surface of claim 62, wherein the adhesive layer contains a peroxide as a tooth whitening agent and a hydrophilic glassy polymer as a base polymer, the hydrophilic glassy polymer is selected from the group consisting of polyvinyl pyrrolidone-vinyl acetate copolymer, polyvinyl pyrrolidone, Polyquaterium-11, Polyquaterium-39, and mixtures thereof, which has a good compatibility with the peroxide and, by adjusting the solvate ratio of water to  
10 ethanol solvents used to form the adhesive layer to be in the range of about 9:1 to 0:10, stability for peroxide with time is obtained without addition of a stabilizer for peroxide and the adhesive layer provides a strong adhesion to teeth while releasing the tooth whitening agent when hydrated on the enamel layers of teeth.

95. The contact surface of claim 94, wherein the peroxide is selected from the group

consisting of hydrogen peroxide, carbamide peroxide, calcium peroxide, sodium percarbonate, sodium perborate, tetrasodium pyrophosphate peroxidate, and combinations thereof.

96. The contact surface of claim 94, wherein the contact surface further comprises polyphosphate in order to enhance a teeth whitening effect.

5           97. The contact surface of claim 96, wherein the polyphosphate is selected from the group consisting of tetrasodium pyrophosphate, sodium acid pyrophosphate, sodium hexametaphosphate, sodium tripolyphosphate, sodium potassium tripolyphosphate, tetrapotassium pyrophosphate, acidic sodium metapolyphosphate, and combinations thereof.

10           98. The contact surface of claim 89, wherein the adhesive layer comprises polyvinyl pyrrolidone having a molecular weight greater than about 500,000.

99. The contact surface of claim 98, wherein the adhesive layer further comprises a stabilizer for peroxide selected from the group consisting of alkylaryl sulphonates, alkyl



sulphates, alkyl carboxylates, alkyl diphenyl oxide disulphonates, sorbitan stearate, Sorbitan monooleate, sorbitan trioleate, and mixtures thereof.

100. The contact surface of claim 98, wherein the contact surface further comprises  
5 polyphosphate in order to enhance a teeth whitening effect.

101. The contact surface of claim 89, wherein the adhesive layer comprises polyvinyl  
pyrrolidone having a molecular weight greater than about 1,000,000.

102. The contact surface of claim 89, wherein the adhesive layer comprises polyvinyl  
10 pyrrolidone having a molecular weight greater than about 1,270,000.

103. The contact surface of claim 98, wherein the hydrophilic glassy polymer in the  
adhesive layer consists essentially of polyvinyl pyrrolidone.

104. The contact surface of claim 101, wherein the hydrophilic glassy polymer in the  
15 adhesive layer consists essentially of polyvinyl pyrrolidone.

105. The contact surface of claim 102, wherein the hydrophilic glassy polymer in the adhesive layer consists essentially of polyvinyl pyrrolidone.

5 106. The contact surface of claim 89, wherein the hydrophilic glassy polymer in the adhesive layer consists essentially of polyvinyl alcohol.

107. The contact surface of claim 89, wherein the hydrophilic glassy polymer in the adhesive layer consists essentially of a mixture of polyvinyl pyrrolidone and polyvinyl alcohol.

10 108. A dry type adhesive matrix for use in a tooth whitening apparatus, said adhesive matrix comprising a tooth whitening agent selected from the group consisting of hydrogen peroxide, carbamide peroxide, calcium peroxide, sodium percarbonate, sodium perborate, tetrasodium pyrophosphate peroxidate, and combinations thereof and a peroxide-compatible hydrophilic glassy polymer as a base polymer, whereby the adhesive matrix has  
15 little or no adhesion strength in a dry state and provides a strong adhesion to teeth while releasing the tooth whitening agent when hydrated on teeth surfaces.

109. The dry type adhesive matrix of claim 108, wherein the hydrophilic glassy  
20 polymer used in the adhesive matrix is selected from the group consisting of

polyalkylvinylether-maleic acid copolymer, polyvinyl alcohol, polyacrylic acid, Poloxamer 407, polyvinyl pyrrolidone-vinyl acetate copolymer, polyvinyl pyrrolidone, Polyquaterium-11, Polyquaterium-39, carbomer, hydroxypropylmethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, gelatin, sodium alginate, and combinations thereof.

5                    110.     The dry type adhesive matrix of claim 109, wherein the adhesive matrix further comprises a stabilizer for peroxide selected from the group consisting of alkylaryl sulphonates, alkyl sulphates, alkyl carboxylates, alkyl diphenyl oxide disulphonates, sorbitan stearate, Sorbitan monooleate, sorbitan trioleate, and mixtures thereof.

                    111.     The dry type adhesive matrix of claim 109, wherein the adhesive matrix  
10 further comprises polyphosphate in order to enhance a teeth whitening effect.

                    112. The dry type adhesive matrix of claim 111, wherein the polyphosphate is selected from the group consisting of tetrasodium pyrophosphate, sodium acid pyrophosphate, sodium hexametaphosphate, sodium tripolyphosphate, sodium potassium tripolyphosphate, tetrapotassium pyrophosphate, acidic sodium metaphosphate and combinations thereof.

113. The dry type adhesive matrix of claim 108, wherein the adhesive matrix contains  
a peroxide as a tooth whitening agent and a hydrophilic glassy polymer as a base polymer, the  
hydrophilic glassy polymer is selected from the group consisting of polyvinyl pyrrolidone-vinyl  
acetate copolymer, polyvinyl pyrrolidone, Polyquaterium-11, Polyquaterium-39, and mixtures  
5 thereof, which has a good compatibility with the peroxide and, by adjusting the solvate ratio of  
water to ethanol solvents used to form the adhesive layer to be in the range of about 9:1 to 0:10,  
stability for peroxide with time is obtained without addition of a stabilizer for peroxide and the  
adhesive layer provides a strong adhesion to teeth while releasing the tooth whitening agent  
when hydrated on the enamel layers of teeth.

10 114. The dry type adhesive matrix of claim 113, wherein the peroxide is selected  
from the group consisting of hydrogen peroxide, carbamide peroxide, calcium peroxide,  
sodium percarbonate, sodium perborate, tetrasodium pyrophosphate peroxidate, and  
combinations thereof.

115. The dry type adhesive matrix of claim 113, wherein the adhesive matrix further

comprises polyphosphate in order to enhance a teeth whitening effect.

116. The dry type adhesive matrix of claim 115, wherein the polyphosphate is selected from the group consisting of tetrasodium pyrophosphate, sodium acid pyrophosphate, sodium hexametaphosphate, sodium tripolyphosphate, sodium potassium tripolyphosphate, tetrapotassium pyrophosphate, acidic sodium metapolyphosphate, and combinations thereof.

117. The dry type adhesive matrix of claim 108, wherein the adhesive matrix comprises polyvinyl pyrrolidone having a molecular weight greater than about 500,000.

118. The dry type adhesive matrix of claim 117, wherein the adhesive matrix further comprises a stabilizer for peroxide selected from the group consisting of alkylaryl sulphonates, alkyl sulphates, alkyl carboxylates, alkyl diphenyl oxide disulphonates, sorbitan stearate, Sorbitan monooleate, sorbitan trioleate, and mixtures thereof.

119. The dry type adhesive matrix of claim 117, wherein the adhesive matrix further comprises polyphosphate in order to enhance a teeth whitening effect.

120. The dry type adhesive matrix of claim 108, wherein the adhesive matrix comprises polyvinyl pyrrolidone having a molecular weight greater than about 1,000,000.

5           121. The dry type adhesive matrix of claim 108, wherein the adhesive matrix comprises polyvinyl pyrrolidone having a molecular weight greater than about 1,270,000.

122. The dry type adhesive matrix of claim 117, wherein the hydrophilic glassy polymer in the adhesive layer consists essentially of polyvinyl pyrrolidone.

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123. The dry type adhesive matrix of claim 120, wherein the hydrophilic glassy polymer in the adhesive layer consists essentially of polyvinyl pyrrolidone.

124. The dry type adhesive matrix of claim 121, wherein the hydrophilic glassy  
15       polymer in the adhesive layer consists essentially of polyvinyl pyrrolidone.

125. The dry type adhesive matrix of claim 108, wherein the hydrophilic glassy

polymer in the adhesive layer consists essentially of polyvinyl alcohol.

126. The dry type adhesive matrix of claim 108, wherein the hydrophilic glassy polymer in the adhesive layer consists essentially of a mixture of polyvinyl pyrrolidine and polyvinyl alcohol.

127. A method of tooth whitening, comprising:

inserting a tooth whitening apparatus into a user's mouth, said tooth whitening apparatus comprising a dry type adhesive matrix comprising a tooth whitening agent selected from the group consisting of hydrogen peroxide, carbamide peroxide, calcium peroxide, sodium percarbonate, sodium perborate, tetrasodium pyrophosphate peroxidate, and combinations thereof and a peroxide-compatible hydrophilic glassy polymer as a base polymer, whereby the adhesive matrix has little or no adhesion strength in a dry state and provides a strong adhesion to teeth while releasing the tooth whitening agent when hydrated on teeth surfaces;

conforming the apparatus to the tooth surfaces of the user's mouth; and

hydrating the adhesive matrix to adhere the apparatus to tooth surfaces of the user's mouth.

128. The method of claim 127, wherein the hydrophilic glassy polymer used in the adhesive matrix is selected from the group consisting of polyalkylvinylether-maleic acid copolymer, polyvinyl alcohol, polyacrylic acid, Poloxamer 407, polyvinyl pyrrolidone-vinyl

acetate copolymer, polyvinyl pyrrolidone, Polyquaterium-11, Polyquaterium-39, carbomer, hydroxypropylmethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, gelatin, sodium alginate, and combinations thereof.

129. The method of claim 128, wherein the adhesive matrix further comprises a  
5 stabilizer for peroxide selected from the group consisting of alkylaryl sulphonates, alkyl sulphates, alkyl carboxylates, alkyl diphenyl oxide disulphonates, sorbitan stearate, Sorbitan monooleate, sorbitan trioleate, and mixtures thereof.

130. The method of claim 128, wherein the adhesive matrix further comprises polyphosphate in order to enhance a teeth whitening effect.

10 131. The method of claim 130, wherein the polyphosphate is selected from the group consisting of tetrasodium pyrophosphate, sodium acid pyrophosphate, sodium hexametaphosphate, sodium tripolyphosphate, sodium potassium tripolyphosphate, tetrapotassium pyrophosphate, acidic sodium metapolyphosphate and combinations thereof.



132. The method of claim 127, wherein the adhesive matrix contains a peroxide as a tooth whitening agent and a hydrophilic glassy polymer as a base polymer, the hydrophilic glassy polymer is selected from the group consisting of polyvinyl pyrrolidone-vinyl acetate copolymer, polyvinyl pyrrolidone, Polyquaterium-11, Polyquaterium-39, and mixtures thereof, which has a good compatibility with the peroxide and, by adjusting the solvate ratio of water to ethanol solvents used to form the adhesive layer to be in the range of about 9:1 to 0:10, stability for peroxide with time is obtained without addition of a stabilizer for peroxide and the adhesive layer provides a strong adhesion to teeth while releasing the tooth whitening agent when hydrated on the enamel layers of teeth.

133. The method of claim 132, wherein the peroxide is selected from the group consisting of hydrogen peroxide, carbamide peroxide, calcium peroxide, sodium percarbonate, sodium perborate, tetrasodium pyrophosphate peroxidate, and combinations thereof.

134. The method of claim 132, wherein the adhesive matrix further comprises polyphosphate in order to enhance a teeth whitening effect.

135. The method of claim 134, wherein the polyphosphate is selected from the group consisting of tetrasodium pyrophosphate, sodium acid pyrophosphate, sodium hexametaphosphate, sodium tripolyphosphate, sodium potassium tripolyphosphate, tetrapotassium pyrophosphate, acidic sodium metapolyphosphate, and combinations thereof.

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136. The method of claim 127, wherein the adhesive matrix comprises polyvinyl pyrrolidone having a molecular weight greater than about 500,000.

137. The method of claim 136, wherein the adhesive matrix further comprises a stabilizer for peroxide selected from the group consisting of alkylaryl sulphonates, alkyl sulphates, alkyl carboxylates, alkyldiphenyloxide disulphonates, sorbitan stearate, Sorbitan monooleate, sorbitan trioleate, and mixtures thereof.

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138. The method of claim 136, wherein the adhesive matrix further comprises polyphosphate in order to enhance a teeth whitening effect.

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139. The method of claim 127, wherein the adhesive matrix comprises polyvinyl

pyrrolidone having a molecular weight greater than about 1,000,000.

140. The method of claim 127, wherein the adhesive matrix comprises polyvinyl pyrrolidone having a molecular weight greater than about 1,270,000.

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141. The method of claim 136, wherein the hydrophilic glassy polymer in the adhesive layer consists essentially of polyvinyl pyrrolidone.

142. The method of claim 139, wherein the hydrophilic glassy polymer in the adhesive layer consists essentially of polyvinyl pyrrolidone.

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143. The method of claim 140, wherein the hydrophilic glassy polymer in the adhesive layer consists essentially of polyvinyl pyrrolidone.

144. The method of claim 127, wherein the hydrophilic glassy polymer in the adhesive layer consists essentially of polyvinyl alcohol

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145. The method of claim 127, wherein the hydrophilic glassy polymer in the

adhesive layer consists essentially of a mixture of polyvinyl pyrrolidine and polyvinyl alcohol.

146. A set of contact surfaces for a set of flexible teeth whitening materials, the  
5 set of contact surfaces, comprising:

an upper teeth contact surface having an upper teeth contact area,  
the upper teeth contact area comprising:

an upper teeth gum line perimeter segment, the  
upper teeth gum line perimeter segment being shaped to  
10 substantially match an upper teeth gum line; and

at least one upper teeth perimeter segment, the  
at least one upper teeth perimeter segment joining with  
the upper teeth gum line perimeter segment to define an  
upper teeth perimeter of the upper teeth contact area; and

15 a lower teeth contact surface having a lower teeth contact area, the  
lower teeth contact area comprising:

a lower teeth gum line perimeter segment, the  
lower teeth gum line perimeter segment being shaped to  
substantially match a lower teeth gum line; and

20 at least one lower teeth perimeter segment, the  
at least one lower teeth perimeter segment joining with  
the lower teeth gum line perimeter segment to define a  
lower teeth perimeter of the lower teeth contact area.

147. The set of contact surfaces of claim 146:

25 wherein the at least one other upper teeth perimeter segment

comprises:

an upper teeth opposing perimeter segment being  
opposite the upper teeth gum line perimeter segment; and

5 a plurality of upper teeth side perimeter segments joining  
the upper teeth gum line perimeter segment and the upper teeth  
opposing perimeter segment; and

wherein the at least one other lower teeth perimeter segment

comprises:

10 a lower teeth opposing perimeter segment being opposite  
the lower teeth gum line perimeter segment; and

a plurality of lower teeth side perimeter segments joining  
the lower teeth gum line perimeter segment and the lower teeth  
opposing perimeter segment.

15 148. The set of contact surface of claim 147, wherein the upper teeth gum line  
perimeter segment comprises an upper teeth wide portion, and wherein the lower teeth gum  
line perimeter segment comprises a plurality of lower teeth wide portions.

20 149. The set of contact surfaces of claim 148, wherein the upper teeth wide  
portion is shaped for aligning contact with the upper central incisors, and wherein the plurality  
of lower teeth wide portions are shaped for aligning contact with the lower canine teeth.

150. The set of contact surfaces of claim 147, wherein each of the flexible teeth  
whitening materials comprise a patch.

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151. The set of contact surfaces of claim 150, wherein each of the patches comprise a dry-type patch.

152. The set of contact surfaces of claim 147, comprising

5 an upper teeth alignment indicia centered along the upper teeth gum line perimeter segment; and

a lower teeth alignment indicia centered along the lower teeth gum line perimeter segment.

10 153. The set of contact surfaces of claim 152, wherein the upper teeth alignment indicia comprises an upper teeth alignment notch, and wherein the lower teeth alignment indicia comprises a lower teeth alignment notch.

154. The set of contact surfaces of claim 147:

15 an upper teeth first side indicia positioned on the at least one other upper teeth perimeter segment;

an upper teeth second side indicia positioned on the at least one other upper teeth perimeter segment and opposing the first side upper teeth indicia along a substantially horizontal axis through the upper teeth contact surface, wherein the substantially horizontal axis through the upper teeth contact surface comprises an upper teeth contact surface folding axis;

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a lower teeth first side indicia positioned on the at least one other lower teeth perimeter segment; and

a lower teeth second side indicia positioned on the at least one other lower teeth perimeter segment and opposing the lower teeth first side

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indicia along a substantially horizontal axis through the lower teeth contact surface, wherein the substantially horizontal axis through the lower teeth contact surface comprises an lower teeth contact surface folding axis.

5                    155.    The set of contact surfaces of claim 154, wherein the upper teeth first side indicia, the upper teeth second side indicia, the lower teeth first side indicia, and the lower teeth second side indicia each comprise a side notch.

10                   156.    The set of contact surfaces of claim 147, wherein the upper teeth contact surface comprises upper teeth cut lines extending from the upper teeth opposing perimeter segment to inside the perimeter of the upper teeth contact surface, and wherein the lower teeth contact surface comprises lower teeth cut lines extending from the lower teeth to opposing perimeter segment inside the perimeter of the lower teeth contact surface.

15                   157.    The set of contact surfaces of claim 147:  
                         wherein the upper teeth opposing perimeter segment comprises a plurality of upper teeth recessed perimeter segments to define an upper teeth noncontact area, said upper teeth noncontact area for aligning noncontact with upper lateral incisor teeth; and

20                                   wherein the lower teeth opposing perimeter segment comprises a plurality of lower teeth recessed perimeter segments to define a lower teeth noncontact area, said lower teeth noncontact area for aligning noncontact with lower lateral incisor teeth.